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PART IV

SCIENTIFIC PERSPECTIVES
ON MEDIEVAL
ARCHAEOLOGY

CHAPTER 15

HEALTH AND WELFARE IN MEDIEVAL ENGLAND: THE HUMAN SKELETAL REMAINS CONTEXTUALIZED

By CHARLOTTE ROBERTS

This paper presents a brief overview of the history of study of human remains from archaeological sites. This is developed into a thematic comparison of health and ill health in early and late medieval periods derived from 72 early medieval (mid-5th to mid-11th centuries ad) and 63 later medieval (mid-11th to mid-16th centuries ad) funerary contexts in England, representing 7122 and 16,237 individual skeletons, respectively. The data presented suggest that populations would have been compromised by health problems during their daily lives. People living in the early medieval period in rural environments were healthier than those living in the later period. The latter's misfortunes were likely due mostly to the impact of urbanism. Air quality, hygiene and sanitation were poorer, the population denser, and housing was more crowded. Infectious disease load was higher, along with the amount of industry in towns and cities, and there was dietary deficiency and excess, while health care varied in provision and quality throughout the medieval period. Future prospects and developments are described, concluding that generally the infrastructure present within England for bioarchaeology to develop further is robust.

INTRODUCTION

The study and interpretation of skeletal remains from archaeological contexts has a long history in England. It is only in the last 25 years or so, however, where there have been significant developments and changes in the discipline now more commonly known as bioarchaeology (Roberts 2006). The positive changes observed are the result of many factors which have changed, almost beyond recognition, the study of ill health in human remains from archaeological sites, better termed palaeopathology.

This paper aims to provide an overview of the state of health, and ill health, in medieval England, considering both early and later medieval periods, based on pooled

data from a large number of cemetery sites. These data are mainly derived from a previously published book (Roberts and Cox 2003), but include more recent research. The emphasis here is on contextualizing the skeletal data, a feature that has taken some time to develop as routine practice in Britain. While exploring the impact of age at death and sex on poor health is now routinely practised in bioarchaeology, this has not always been a focus and thus much published (and unpublished) data on the evidence for disease lack this association. For this paper, it was not always possible to explore patterns with respect to age at death and biological sex; this is also the case for funerary contextual data. Additionally, and for brevity, the paper does not consider disease in cremated remains, due to the limited evidence available (McKinley 2000). To begin with, it is worth reflecting on bioarchaeology's development in Britain.

RECENT DEVELOPMENTS

There have been a number of key influences over the last 50 years or so regarding our knowledge and awareness of the health of our ancestors in England. Perhaps the most well-known practitioners are Don Brothwell (b 1934), Keith Manchester (b 1938) and the late Calvin Wells (d 1978). Their contributions are broad but their key books have been particularly influential, and remain so today (1981; 2005 — 3rd edition with Roberts 1964, respectively). Many more scholars, however, including younger researchers, have contributed to increasingly focused topics from the 1980s onwards, for example the late Trevor Anderson (developmental and carcinogenic problems), Megan Brickley (metabolic diseases such as rickets and scurvy, or vitamin D and C deficiency), Rebecca Gowland (the impact of plague on mortality), Simon Hillson and Dorothy Lunt (dental disease), Chris Knüsel (impact of activity on the skeleton), Louise Humphrey (impact of health on growth), Mary Lewis (the health of children), Simon Mays (many areas, but especially metabolic diseases such as osteoporosis, and infections such as tuberculosis), the late Juliet Rogers (joint disease), and Tony Waldron (on a variety of topics but especially emphasizing how to interpret data on disease). In recent years, additional contributions have been made by scholars working in biomolecular archaeology, most notably Abigail Bouwman, Terry Brown, Helen Donoghue, Mark Spigelman and Mike Taylor (ancient DNA analysis of tuberculosis, leprosy, venereal syphilis and malaria), and Mike Richards and Gundula Müldner on palaeodiet, the quality and quantity of which impacts on the burden of disease experienced by people today and would have in the past (see Müldner, this volume).

In contrast to today's bioarchaeologists, Wells was, and Manchester still is, a medical practitioner whose interests in archaeology were awakened locally through excavations of cemeteries in East Anglia and Yorkshire, respectively. Their paths into palaeopathology were guided by providing reports on skeletons from local excavations. Manchester went on to teach undergraduate and postgraduate students at the University of Bradford, thus igniting an interest in the wider archaeological community. Brothwell, a graduate in geology and zoology has, in the present writer's opinion, made the most substantial contribution to the development of palaeopathology in Britain. His publications range from seminal papers on population health in

Britain (eg 1961), to work on animal diseases (Baker and Brothwell 1980), the study of 'bog bodies' (Brothwell 1986), the impact of environment on health (Brothwell 1994), and research into specific diseases (Brothwell 2006). He remains a guiding light for bioarchaeology in Britain today. In recent years, with greater numbers of bioarchaeologists engaging in international conferences and publishing in international journals, Britain is fast establishing itself as a key contributor to the study of ill health in the past, using traditional and novel techniques of analysis, with its scholars producing globally used texts for both teaching and research (eg Cox and Mays 2000; Hillson 1996; Mays 1998; Pinhasi and Mays 2008; Roberts and Manchester 2005; Rogers and Waldron 1995; Waldron 1994).

Several key methodological advances have also shaped the more recent development of the discipline, most notably, perhaps, the introduction of standards for recording skeletal remains (Brickley and McKinley 2004). Previously, the standards produced by Buikstra and Ubelaker (1994) were most commonly used, and are still applied around the world. Their standards were a response to the threat of repatriation and reburial of skeletal remains of indigenous North Americans which prompted the need for systematic and standardized recording of such remains before they were lost to science. The ultimate aim was to ensure that all data were recorded in a standard way to facilitate comparison between skeletal assemblages. It is therefore heartening to see standards for recording of skeletal remains in Britain now that reburial is becoming more common (Ministry of Justice 2008).

Over the last 15 years guidance documents have been issued by a range of sectors regarding the law and burial archaeology (Garratt-Frost 1992), excavation and post-excavation treatment (McKinley and Roberts 1993), preparation of skeletal reports (English Heritage 2004), curation of human remains (Department for Culture, Media and Sport 2005), dealing with burials from sites within the jurisdiction of the Church of England (English Heritage and Church of England 2005), and from Scotland (Historic Scotland 1997), and Ireland (O'Sullivan *et al* 2002; O'Sullivan and Killgore 2003; Buckley *et al* 2004). These documents have been instrumental in informing bioarchaeologists and other interested parties about the various issues surrounding the study of human remains. The establishment of the British Association of Biological Anthropology and Osteoarchaeology in 1998 has also brought together bioarchaeologists working in a variety of fields, with the common goals of reconstructing past human behaviour, including exploring the impact of life on health (<http://www.babao.org.uk>). The Paleopathology Association, based in North America and founded in 1973, is also the key international group for many working in the field in Britain (<http://www.paleopathology.org>).

Finally, and mainly since the 1990s, one-year intensive masters courses on the study of human remains have been established at various universities in Britain. These courses mostly include palaeopathology in their curriculum; all have created a facility for training this and the next generation of bioarchaeologists. Until recently most physical anthropologists were employed in anthropology departments and focused on non-human primates and early hominines, but encouragingly there has been an increasing recognition of bioarchaeology's contribution to archaeology by a number of

academic appointments in archaeology departments. Equally importantly, the introduction of PPG16 (Department of the Environment 1990) brought about a massive increase in the number of excavations in general, and cemeteries in particular, in advance of modern development. This development has generated a substantial number of skeletal assemblages, and in some cases involving very large numbers of skeletons (eg 10,516 at St Mary Spital, London — Connell *et al* in press; <http://www.museumoflondon.org.uk/English/Collections/OnlineResources/CHB>). This aspect has had the fortunate consequence of generating employment for many masters' graduates, and an increasing number of influential monographic publications (eg Drinkall and Foreman 1998; Fiorato *et al* 2007; Mays *et al* 2007; Connell *et al* in press). The overall effect has been to stimulate interest in bioarchaeology among the academic and contract archaeology communities, but especially to the general public via television programmes such as 'Meet the Ancestors', shown on BBC2 for several years. In terms of research, all of the above factors have influenced the range of studies of health and disease. There has been a gradual change of emphasis from case studies of individual skeletons to population base assessments of health focused on specific questions or hypotheses and using more novel techniques of analysis. Population studies, however, are still relatively rare compared to other parts of the world such as North America (see Mays 1997; in press). A matter of concern is that there needs to be an increase in placing data on health and disease in archaeological context if those data are to make any meaningful contribution to understanding the past (eg see Steckel and Rose 2002; Roberts and Cox 2003; Gowland and Knüsel 2006; Connell *et al* in press; Cohen and Crane-Kramer 2007). Those who doubt the value of the study of human remains in archaeology need only consider that archaeology can be defined as the study of past people. Human remains are the primary evidence for people and the closest we ever get to our ancestors.

WHAT DO WE KNOW ABOUT HEALTH IN BRITAIN?

Essentially, everybody experiences ill health today and would have in the past; thus, studying health is a unique way of understanding how people adapted to changing socio-economic and political environments through time, that is whether they experienced poor health and how that affected their ability to function in their communities. While people can adapt to change they may also initiate it, a factor which illustrates what it means to be human.

Recognition of bone changes as a result of disease comes in the form of either bone formation or destruction, or a combination of both in particular distribution patterns related to clinical knowledge (Roberts and Manchester 2005). It is not necessarily straightforward, however, to diagnose specific disease as the bone changes might represent several diseases, and the skeleton being examined may be fragmentary, thus compromising observation of distribution patterns. Skeletal data collected are therefore usually presented as individual studies of skeletons with specific diseases, broad population studies of ill health in people buried at a particular site during a specific period, or studies of one disease both temporally and spatially; methodological

papers focusing on disease are also of relevance (macroscopic, radiological, microscopic and biomolecular).

In some cases the data are placed into context to explain patterns observed, for example the impact on tuberculosis frequency of housing, population density, occupation, keeping animals, poverty and quality of diet. In other instances, there is little reference to context and the data are isolated as an example of a disease at a point in time in a specific place. Furthermore, when focusing on frequency of disease, one has to consider the impact of immune system strength of the people being analysed and their ability to fight disease (and show bone changes), and how representative the skeletal sample is of the living and dead population (Waldron 1994). A particular problem for interpretation of data, specifically for the later medieval period, is often the lack of high-resolution stratigraphic (or indeed radiocarbon) dating with which to trace fluctuations in disease over time within a given cemetery. Furthermore, the impact of marine-based diets on radiocarbon dates remains a continuing challenge (Bayliss *et al* 2004).

Presented here are a subset of data collected for the early and later medieval chapters of Roberts and Cox (2003), a subset meaning data on disease considered under particular themes which inform us about the impact of people's lives on their health. In addition, data from more recent studies are also incorporated. The data in Roberts and Cox (2003) derive from 72 early medieval (mid-5th to mid-11th centuries AD) and 63 later medieval (mid-11th to mid-16th centuries AD) funerary contexts in England, representing 7122 and 16,237 individual skeletons, respectively. The material was derived from published and unpublished works by a wide variety of authors completed over many years. Ideally, data would have been collected from the skeletons by one person using standardized methods. But, for obvious reasons, pooled data has been used in order to consider patterns of health in a large sample over long periods of time in a large geographic area.

Rather than consider evidence for disease in medieval England in categories such as 'infection', 'metabolic disease', and 'joint disease', in order to better contextualize the data, it is approached within three themes: 'living environment', 'economy and diet', and 'access to health care'. The data are divided into early (mid-5th to mid-11th centuries AD) and later medieval (mid-11th to mid-16th centuries AD) to explore general differences in health between the two periods, the first being at a time when people lived in more rural environments, and the second being a time when people were more urbanized. It should be noted that a greater number of urban cemeteries of the late medieval period have been excavated and their skeletal remains analysed, than rural cemeteries of the early medieval period; thus, the sample size for the latter is greater and may impact on the data available.

Living environment

It is well known that our interior (house) and exterior (outside the house) living environment contributes positively and negatively to our health status (eg see Bruce *et al* 2002; Namdeo *et al* 2005). Whether we live in urban or rural communities, coastal or inland areas, in the highlands or lowlands, in tropical, arctic or temperate climates, our environment will impact on the types of diseases we may experience.

Compounding the overall risk to health of these different environments is the work that we do (indoors or out?), the fuel we use for cooking, heating and travelling, and our innate immunity in these different environments. Teasing out which of many variables actually caused a health problem in any one environment is difficult in bioarchaeology, but it is possible to look overall at differences between people by focusing on disease that can be related to environment.

In order to determine whether air quality during the medieval period, both indoors and out, was such that it affected respiratory health, the frequency of sinusitis was explored. Sinusitis is an inflammation of the air-filled sinuses of the face which, in skeletal remains, can be recognized usually as bone formation (Figure 15.1); the sinuses comprise part of the upper respiratory system (Roberts 2007). Sinusitis may be caused by a number of factors, including allergies, air pollution and smoking, and it may be a complication of dental disease in the upper molar teeth and occur in people whose occupations generate particulate pollution, such as smelting metals, making pottery and mining (see Roberts and Cox 2003, 236–237, for an overview of possible occupations practised in the later medieval period). The frequency of maxillary sinusitis for skeletons from six early and six late medieval sites were considered: early: Norton, Cleveland (Jakob 2004), Bishopsmill School, Yorkshire (Bernofsky 2006), Spofforth, Yorkshire (Bernofsky 2006), Raunds, Northamptonshire (Roberts *et al* 1998), Castledyke, Barton-on-Humber, Lincolnshire (Jakob 2004), and Apple Down, Sussex (Jakob 2004); late: Wharram Percy (Lewis *et al* 1995), St Helen-on-the-Walls, York (Lewis *et al* 1995), Jewbury, York (Lilley *et al* 1994) and Fishergate House, York (Papapalekanos 2001), all in Yorkshire, Chichester, Sussex (Boocock *et al* 1995); with one post-medieval site for comparative purposes, Christ Church, Spitalfields, London (Roberts 2007). All the early medieval sites were rural in nature, while all the late sites were urban, apart from Wharram Percy.

Frequencies of sinusitis varied from 16% to 80% of individuals affected for the early period and 31% to 71.9% for the later period, with an overall higher rate



FIGURE 15.1 Example of sinusitis — new bone formed in maxillary sinus.

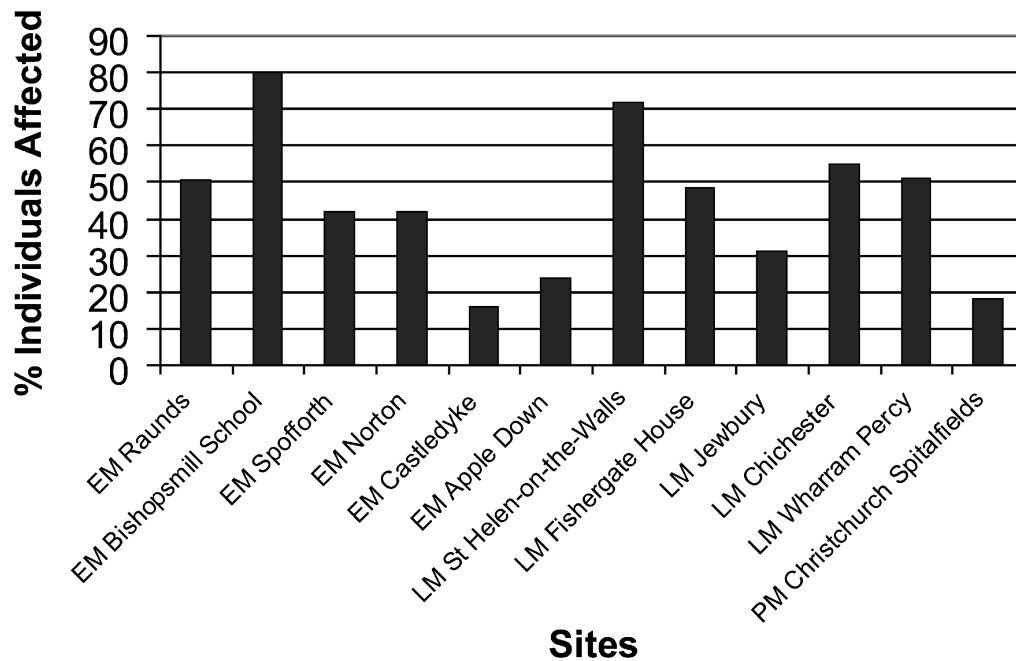


FIGURE 15.2 Frequency of sinusitis at early and later medieval sites in England (EM = early medieval; LM = late medieval; PM = post-medieval).

observed for the later sites (Figure 15.2). Factors which might contribute to this could include housing structure, higher population density and working in occupations which all affected air quality. Of interest is the high frequency at the Bishopsmill School site, contrary to the other sites; there is no obvious reason for this rate at this site but there is no available appropriate archaeological data to expand interpretation. At the later medieval sites, people buried at St Helen-on-the-Walls had the highest frequency and the males were especially severely affected; these data may reflect the intensively urban nature of the environment at the time in York, with closely packed housing, the perceived poverty of this population, and also the many industries being practised nearby in the Bedern district of the city. They may all have had their part to play in affecting air quality (brewing, tanning, lime-burning, etc). The lower frequency seen at Jewbury (Lilley *et al* 1994), although roughly contemporary with St Helen-on-the-Walls, may reflect the higher-status nature of this group of Jewish people and that they were, to a certain extent, protected from poor quality air by the very nature of their housing and the type of work they did. The frequency at the leprosy hospital of St James and St Mary Magdalene, Chichester, can be viewed as related to leprosy as this infectious disease predisposes people to sinusitis. The relatively high rate seen at Wharram Percy may reflect poor air quality due to pollen, animal dander and a general response to allergens. As a contrast, the post-medieval site of Christ Church, Spitalfields, gave an 18% frequency which is the lowest of all the sites; again, it is suggested that these middle-class people were protected from what was seen at the

time to be a polluted environment in London (Molleson and Cox 1993). It is known, for example, that many of their houses were well ventilated and had chimneys, which dissipated the smoke from fires in a much more efficient way compared to earlier periods. It is also suggested that the (presumed) thatched roofs of early medieval houses may not have predisposed to smoky indoor environments as the smoke would dissipate through the thatch. People likely spent more time outdoors, too, engaged in agricultural tasks such as growing crops and keeping animals.

At the same time, lesions on ribs, reflecting lung infection, rise from the early to late medieval period. While research since 1984 suggests the likely cause of these lesions is infection from pulmonary tuberculosis (eg Kelley and Micozzi 1984; Roberts *et al* 1994; Lambert 2002; Santos and Roberts 2006), other infections (pneumonia, chronic bronchitis), including those initiated by poor air quality, could equally cause rib lesions. Thus, rib lesions caused by the same factors as sinusitis presented a common outcome for people living in towns. Poor air quality may also be explored through observing the effects of vitamin D deficiency on health in skeletal remains. This vitamin is formed in the skin but needs sunlight to manufacture it; it is necessary for the absorption of calcium and phosphorus in the diet so that the bones of the skeleton form correctly. If these processes are prevented through lack of sunlight then the bones are not mineralized, but soft and deformed (rickets in children and osteomalacia in adults). That people in both early and late medieval England show very little sign of vitamin D deficiency is seen in the general lack of skeletons with the recognizable bone changes, apart from prominent examples from late medieval Wharram Percy (Ortner and Mays 1998) and early medieval Jarrow (Anderson *et al* 2005).

There are also other clues in skeletal remains that belie quality of living environment of past populations. Eye sockets of skulls can develop small holes in their surfaces, termed by many as *cribra orbitalia* (Figure 15.3). These bony changes are believed to be the result most likely of increased pathogen load as a result of



FIGURE 15.3 Example of *cribra orbitalia* — ‘holes’ in eye sockets.

infectious disease, although other diagnoses might include vitamin C deficiency (see Ortner 2003; Wapler *et al* 2003). Cribra orbitalia increases in frequency from the early to late medieval periods and suggests that the latter's urban living environment was 'less healthy' than its predecessor. Poor hygiene and sanitation may have predisposed people to more infectious disease and thus their body adapted to those circumstances. Essentially, if a person experiences infection, their body withholds iron from the pathogens causing the infection, resulting in iron deficiency, as seen in the holes in the orbits which indicate the red bone marrow working overtime to produce more red blood cells (Stuart Macadam 1992). As Ortner (2008) points out, attributing anaemia to these lesions is risky unless there is other evidence to support the diagnosis.

There are other signs of infections increasing in the later medieval period. For example, skeletal evidence for tuberculosis (TB) sees an increase compared to the early medieval period (Roberts and Buikstra 2003). An infection resulting from specific human and other animal bacteria (*Mycobacterium tuberculosis* and *Mycobacterium bovis*, respectively), it is related to increased population density (the 'sneezing distance apart' is important for transmission of the bacteria from human to human via the lungs), and working with and ingesting infected products of animals such as cattle, pigs, and sheep. Contemporary historical evidence indicates that housing and population in urban situations was very dense (Dyer 1989). It is presently unknown whether the human or animal form of TB was most damaging for humans in medieval England, although ancient DNA analysis has isolated *M. tuberculosis* as causing TB at Wharram Percy (Mays *et al* 2001). Furthermore, little attention has been paid by zooarchaeologists to identifying TB in animal bones, although some (albeit debatable) evidence from Wharram Percy cattle ribs indicates that it may have been present there (Mays 2005). Leprosy, an infection caused by *Mycobacterium leprae*, also increases in the late medieval period (see Roberts 2002 for a summary of skeletal evidence, and Rawcliffe 2006 for an overview of leprosy in England). As this infection is also transmitted from human to human via the lungs, higher population density is necessary for its dispersal. Of interest is its decline in the 14th century AD in England, with a concurrent increase in tuberculosis (TB). This has been explained as likely due to the cross immunity induced by the bacteria (*Mycobacterium*) that cause the diseases. In effect, the TB bacterium is considered an earlier entity when compared to the leprosy bacterium and, with bacterial evolution, the leprosy bacterium saw a decrease in virulence. Thus, with biological competition, TB takes precedence over leprosy. Increasing exposure to TB during the height of urbanism in the late medieval period may have led to a degree of immunity to leprosy, thus reducing the chances of contracting leprosy (Manchester 1984; Leitman 1997).

Economy and diet

A well-balanced diet is essential for life, a strong immune system and a healthy body. Thus, the type of subsistence practised in the past was instrumental for providing people with food. Health therefore might have been affected by dietary deficiency, or even excess, and ultimately degeneration of the structure of the skeleton. In the medieval period, of course, the emphasis was on agriculture, although the collecting of wild plants and hunting wild animals was certainly not unknown and

especially seen in rural society in the early medieval period. Along with settled communities and agriculture, health has been shown to decline in many studies of skeletal remains (eg Cohen and Crane Kramer 2007). For example, hunting and gathering can sustain small groups of people and provided a generally healthy, well-balanced and varied diet; people are also regularly mobile and therefore probably fitter than more sedentary farmers.

While there was very little evidence for specific dietary deficiency diseases such as a lack of vitamin C (scurvy) in both early and later periods, there was evidence for an increase in defects in the enamel of the teeth as time progressed. Enamel defects (or hypoplasias) can be seen in the teeth (Figure 15.4) and reflect stress during growth in childhood, the stress usually referring to dietary problems (Hillson 1996). A considerable increase overall of hypoplasia in the late period perhaps reflects increased population pressure on available resources and harvest failures in parts of the 13th, 14th and 15th centuries (Dyer 1989). Along with an increase in enamel defects, stature is also a reflection of quality and quantity of diet during the growth period. It declines from the early medieval period in both males and females, respectively (Figure 15.5). Males decline from 1.72m (5ft 6½in) to 1.71m (5ft 6in) and females decline from 1.61m (5ft 3in) to 1.59m (5ft 2in); while this decline does not appear large, it should be remembered that these are pooled average data from 996 male and 751 female early medieval skeletons and 8494 male and 7929 female late medieval skeletons from across England. Thus, the decline is clear, even from this large sample, and supports the enamel defect data for a likely dietary problem in the late medieval period.

Two examples of excess in the diet, especially in the late medieval period, can be seen in the increased frequency of dental caries and diffuse idiopathic skeletal hyperostosis (DISH). Caries (Figure 15.6) is an infectious disease of the teeth caused by a combination of carbohydrates (sugars) in the diet, plaque on the teeth (poor oral hygiene), and a lack of fluoride (Hillson 1996). Bacteria in plaque ferments sugars in the diet to produce acids that demineralize the tooth structure. Sugar was not

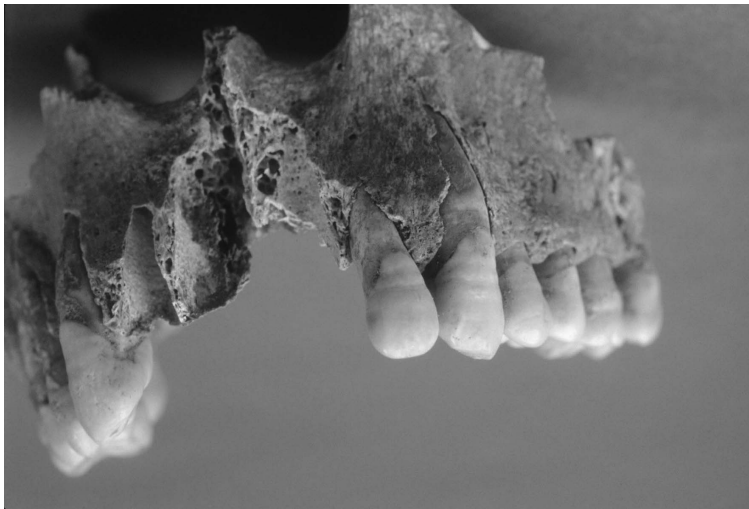


FIGURE 15.4 Example of enamel hypoplasia — lines, pits or grooves in the enamel of the teeth.

Stature

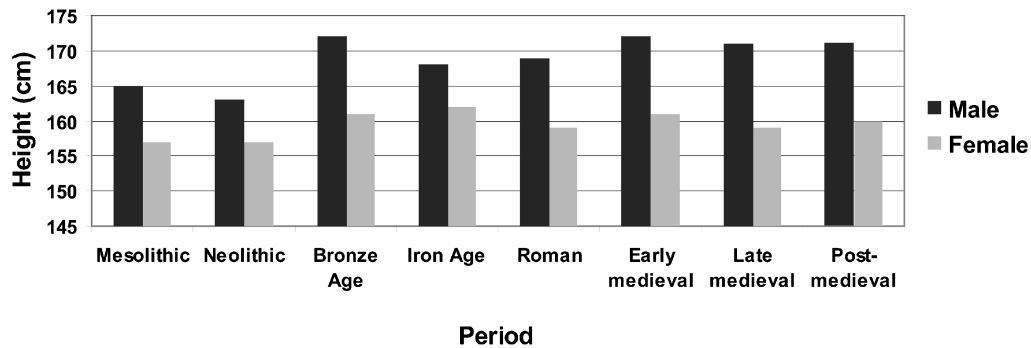


FIGURE 15.5 Stature through time in males and females in Britain.



FIGURE 15.6 Example of dental caries in a molar tooth. (Courtesy of Anwen Caffell)

introduced to England until the 12th century AD, which correlates with what is seen in caries rates, that is that they increase from the early to late medieval period (Figure 15.7). A more detailed study of regional caries rates in England showed that they also increased in both monastic and non-monastic sites from early to late periods (Caffell 2005); caries rates were lower in coastal sites overall which reflects the preventative nature of the high fluoride content of fish. DISH primarily affects the spine (Figure 15.8) and has been noted in monastic populations in England and elsewhere (see Rogers and Waldron 2001). In living populations DISH seems to have an association with Type II diabetes, obesity, older age and being male (see Resnick

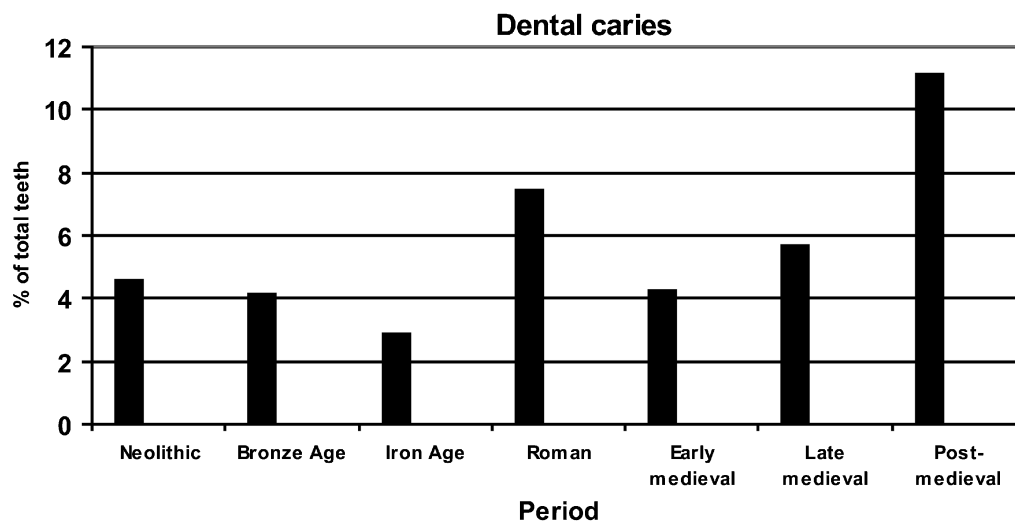


FIGURE 15.7 The frequency of caries through time in Britain.

1995). It has been suggested that it may be related to excess protein in the diet, amongst other components, and to the monks' diet, although DISH is found also in non-monastic groups in late medieval England. Current research is exploring the diet and hereditary hypotheses for DISH (Spencer, submitted).

Access to health care

Everybody was unhealthy at some point in their lives during the early and late medieval periods, but what kind of health care did they access, if any? Today we live long enough for cancer and heart disease to take hold, and infant mortality has declined, but our length of life is determined by the availability of health care and better living conditions. There is much historical data for medical and surgical care in the medieval period (eg Porter 1997). In the late medieval period, for example, physicians, surgeons and bone setters are known and diagnosis of disease using urine, blood and faeces are described. Herbal remedies, cautery, bloodletting, bathing and specific diets were recommended as treatments. The most common evidence for treatment seen in skeletal remains is trepanation, but also amputation and dentistry, and wound dressings have been noted (see Roberts and Cox 2003 for an overview). There is also much evidence for the founding of hospitals especially in the late medieval period, both for people with general health problems but also for those with leprosy (Orme and Webster 1995).

Trepanation, or making a hole in the skull, was used to treat a number of complaints such as headache, epilepsy, migraine, and head injuries. Five types of trepanation (scraped, gouged, bored and sawed, square sawn, and drilled) have been observed in the bioarchaeological record reflecting materials available to be used as surgical implements. The scraped method appears quite common in Europe, and England in particular (Roberts and McKinley 2003). Here the majority of trepanations

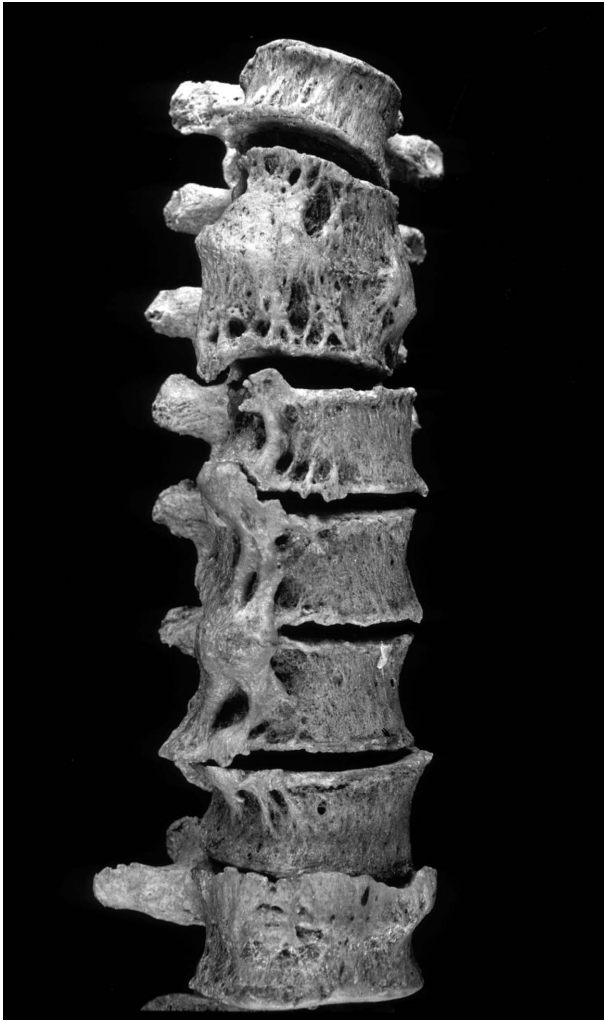


FIGURE 15.8 Example of DISH affecting the spine — new bone formation on the right side of the spine resulting in fusion.

come from the early medieval period and relatively few from the later period. Most of the skulls showed no reason for the operation but the vast majority were healed. Of particular interest was that most individuals derived from 'normal' funerary contexts for the period, indicating that people who had been trepanned were generally not treated differently to their peers through time.

Not all evidence for care and treatment in the medieval period will be visible on the skeleton and it remains difficult to determine whether early or late medieval people had better or worse access to care. All that can be said is that there is evidence for care in both periods, and that males, females, different status and age groups would likely have had access to different levels of care. Thus, inequality in provision of health care would have been evident as it is today.

CONCLUSIONS AND FUTURE PROSPECTS FOR HUMAN BIOARCHAEOLOGY IN BRITAIN

While this brief overview of health in medieval England has focused on certain conditions, it is clear from the data presented that populations would have been compromised by health problems during their daily lives. People living in the early medieval period in rural environments appear to have been healthier than those living in the later period. The latter's misfortunes were likely due mostly to the impact of urbanism, although the data from the skeletal remains from that time derives mostly from urban cemeteries. Air quality, hygiene and sanitation were poorer, and the population was denser, with housing being more crowded. Infectious disease load was higher, along with the amount of industry in towns and cities there was dietary deficiency and excess, while health care varied in provision and quality throughout the medieval period. It should be remembered, however, that evidence for diseases from skeletal remains contain biases that must be accounted for, several of which are discussed above. Furthermore, only disease that affects the bones or teeth will be seen, unless DNA analysis has been used to detect ancient pathogens that had not impacted on the skeleton at death. Disease that only affects the soft tissues, such as plague and childhood diseases such as measles and chicken pox, will not be detected unless contemporary historical data is accessed (see Wood *et al* 1992 for an overview of the problems of inferring health from the skeleton).

Using large samples of skeletons produces an overview of health in the medieval period, but it also shows that there is much more to be learned. The medieval period was a time when there was a transition from small rural communities to urban societies where life was much more complex and potentially damaging to health. In the future more nuanced approaches to understanding health and answering specific questions/testing hypotheses are advocated with regional syntheses of medieval England being the focus, although similar approaches to health in Britain as a whole should be the ultimate goal. This will allow comparison of health between, for example, northern and southern regions, western and eastern regions, and coastal and inland areas, along with particular studies of health differences between the sexes, age groups, identities and statuses. Along with integrated biomolecular studies aimed at tracking the mobility of people, their diet and specific diagnoses of disease, and historical data analysis to flesh out the bones, multidisciplinary teams of researchers will undoubtedly change the face of what we know about health in medieval England. Of vital importance in this respect is the absolute need to record data in a standardized way so that comparative research can be done reliably. Particularly important too is the need for bioarchaeologists to work with other specialists to understand better the nature of other types of evidence that can be used for interpretation of the skeletal data. Additionally, working with contract archaeologists will identify what important questions need to be answered and how bioarchaeology can help.

There are, however, a number of developments needed in infrastructure to ensure that bioarchaeology flourishes as an integral part of archaeology. Establishing skeletal databases to provide information on the location and nature of skeletal collections available for study will allow these remains to be more effectively used.

Essentially, such information will help spread the handling load on an important archaeological resource, and encourage researchers to utilize skeletal collections outside of London more frequently, ultimately allowing bioarchaeologists to fill gaps in knowledge about health by understanding the nature of the resource better. A database saves valuable researchers' time searching for collections relevant to their questions. Access to grey literature is also essential so that important data becomes readily available in the public domain; 38% of the 311 site reports utilized for Roberts and Cox (2003) were unpublished.

Nevertheless, the future for bioarchaeology in Britain is potentially very bright. There are masters and PhD courses to provide training, many trained practitioners, a national organization (BABAO), large skeletal collections for analysis, standards for data recording, analytical facilities, and experienced specialists to conduct analyses beyond the basic macroscopic/visual stages of recording. 'The cloud on the horizon, which will probably not go away, is the reburial issue . . . there is good cause to review where our studies have got to and which aspects deserve our special research efforts before it is too late' (Brothwell 2000, 5). Brothwell's comments are very timely today and we need to heed his warning.

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Article title:

HEALTH AND WELFARE IN MEDIEVAL ENGLAND: THE
HUMAN SKELETAL REMAINS CONTEXTUALIZED

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AUTHOR QUERY SHEET

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